

Validation of Two Field Base Dynamic Balance Tests in the Activation of Selected Hip and Knee Stabilizer Muscles

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Abstract : The purpose of this study was to validate muscle activation amplitudes of two field base dynamic balance tests that are used as strengthen and motor control exercises too in the activation of selected hip and knee stabilizer muscles. Methods: Eighteen college-age females students (21 ± 2 years; 65.6 ± 8.7 kg; 169.7 ± 8.1 cm) who participated at least for 30 minutes in physical activity most days of the week volunteered. The wireless BIOPAC (MP150, BIOPAC System. Inc, California, USA) surface electromyography system was used to validate the activation of the Gluteus Medius and the Adductor Magnus of hip stabilizer muscles; and the Hamstrings, Quadriceps, and the Gastrocnemius of the knee stabilizer muscles. Surface electrodes (EL 503, BIOPAC, System. Inc) connected to dual wireless EMG BioNormadix Transmitters were place on selected muscles of participants dominate side. Manual muscle testing was performed to obtain the maximal voluntary isometric contraction (MVIC) in which all collected muscle activity data during the three reaching direction: anterior, posteromedial, posterolateral of the Star Excursion Balance Test (SEBT) and the Y-balance Test (YBT) data could be normalized. All participants performed three trials for each reaching direction of the SEBT and the YBT. The domanial leg trial for each participant was selected for analysis which was also the standing leg. Results: the selected hip stabilizer muscles (Gluteus Medius, Adductor Magnus) were both greater than 100%MVIC during the performance of the SEBT and in all three directions. Whereas, selected knee stabilizer muscles had greater activation Of 100% MVIC and were significantly more activated during the performance of the YBT test in all three reaching directions. The results showed that the posterolateral and the postmedial reaching directions for both dynamic balance tests had greater activation levels and greater than 200%MVIC for all tested muscles expect of the hamstrings. Conclusion: the results of this study showed that the SEBT and the YBT had validated high levels of muscular activity for the hip and the knee stabilizer muscles; which can be used to represent the improvement, strength, control and the decreasing in the injury levels. Since these selected hip and knee stabilizer muscles, represent 35% of all athletic injuries depending on the type of sport.

Keywords : dynamic balance tests, electromyography, hip stabilizer muscles, nee stabilizer muscles

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